



US006665401B1

(12) **United States Patent**
Chen(10) **Patent No.:** **US 6,665,401 B1**(45) **Date of Patent:** **Dec. 16, 2003**(54) **METHOD FOR CANCELING ECHO**(75) Inventor: **Yueh-Chang Chen, Hsinchu Hsien**
(TW)(73) Assignee: **Winbond Electronics Corp., Hsinchu**
(TW)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/543,007**(22) Filed: **Apr. 4, 2000**(30) **Foreign Application Priority Data**

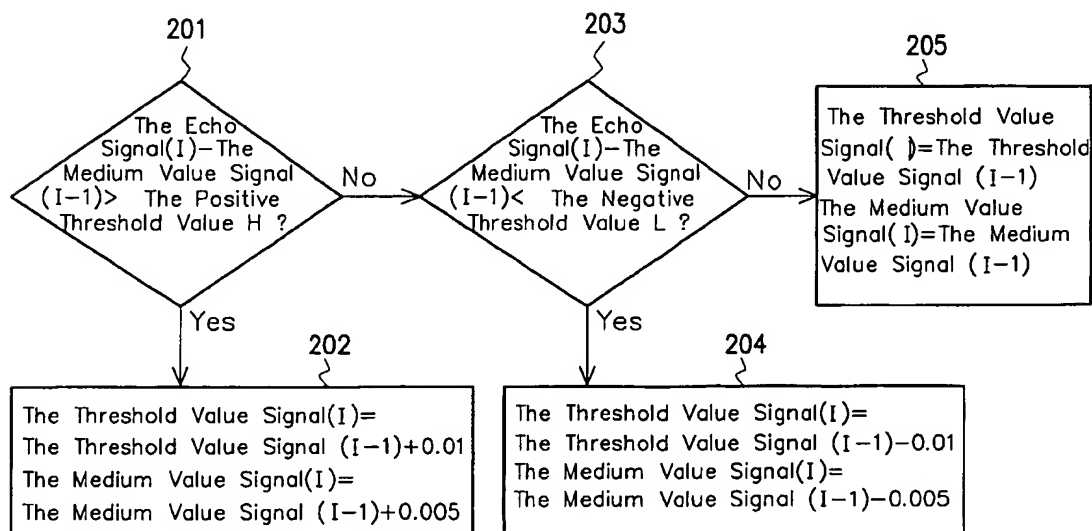
Feb. 25, 2000 (TW) 89103351 A

(51) Int. Cl.⁷ **H04M 1/00**(52) U.S. Cl. **379/406.02; 379/406.06;**
708/322(58) Field of Search 379/406.01, 406.02,
379/406.04, 406.06, 406.08, 406.11; 708/300,
322(56) **References Cited****U.S. PATENT DOCUMENTS**6,035,034 A * 3/2000 Trump 379/406.06
6,532,289 B1 * 3/2003 Magid 379/406.01
6,608,897 B1 * 8/2003 Jin et al. 379/406.09

* cited by examiner

Primary Examiner—Minsun Oh Harvey*Assistant Examiner*—Jefferey Harold(74) *Attorney, Agent, or Firm*—J.C. Patents(57) **ABSTRACT**

A method for canceling echo. A threshold value signal is set to a preset value and the threshold value signal and a medium value signal are keep at a level of the preset value. Diagnosis is made as to whether a difference between an echo signal (I) and the medium value signal (I-1) is more than a positive threshold value or less than a negative threshold value. When the difference between an echo signal (I) and the medium value signal (I-1) is more than the positive threshold value, the level of the medium value signal (I) is increased by an upraise speed and the level of the threshold value signal (I) is increased by a first speed faster than the upraise speed. When the difference between the echo signal (I) and the medium value signal (I-1) is less than the negative threshold value, the level of the medium value signal (I) is decreased by a drop speed and the level of the threshold value signal (I) is decreased by a second speed faster than the drop speed. When the difference between the echo signal (I) and the medium value signal (I-1) is not more than the positive threshold value or not less than the negative threshold value, which represents the level of the echo signal (I) in an normal range without adjusting the threshold value, the symbol (I) represents a present condition of a corresponding signal and the symbol (I-1) represents a previous condition of a corresponding signal.

7 Claims, 4 Drawing Sheets

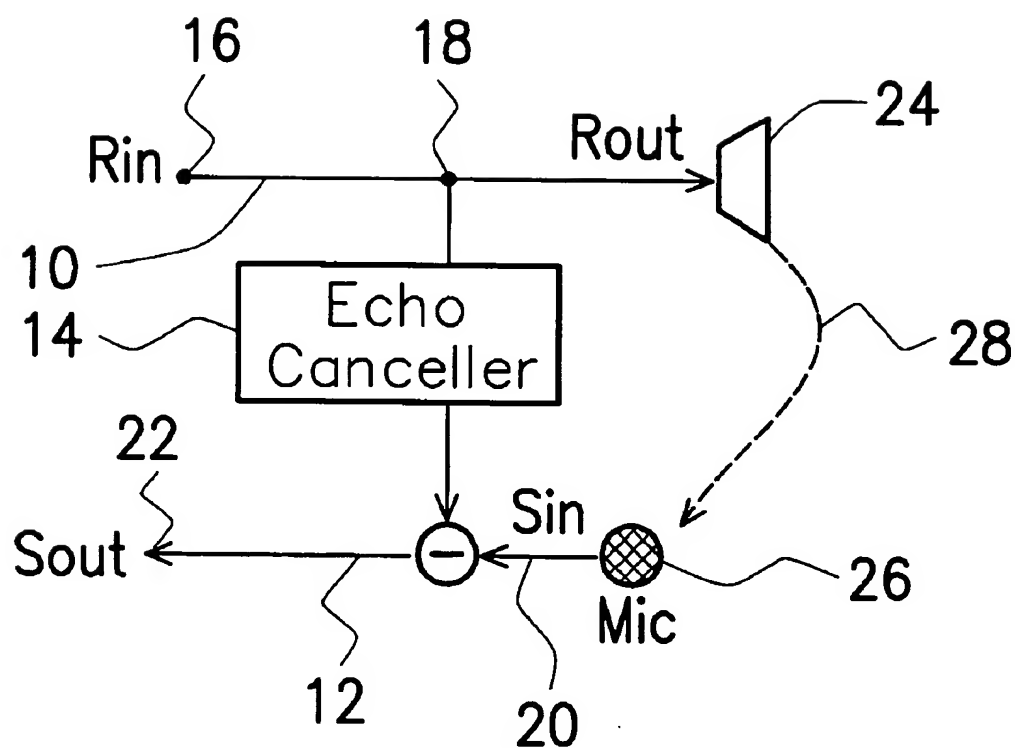


FIG. 1

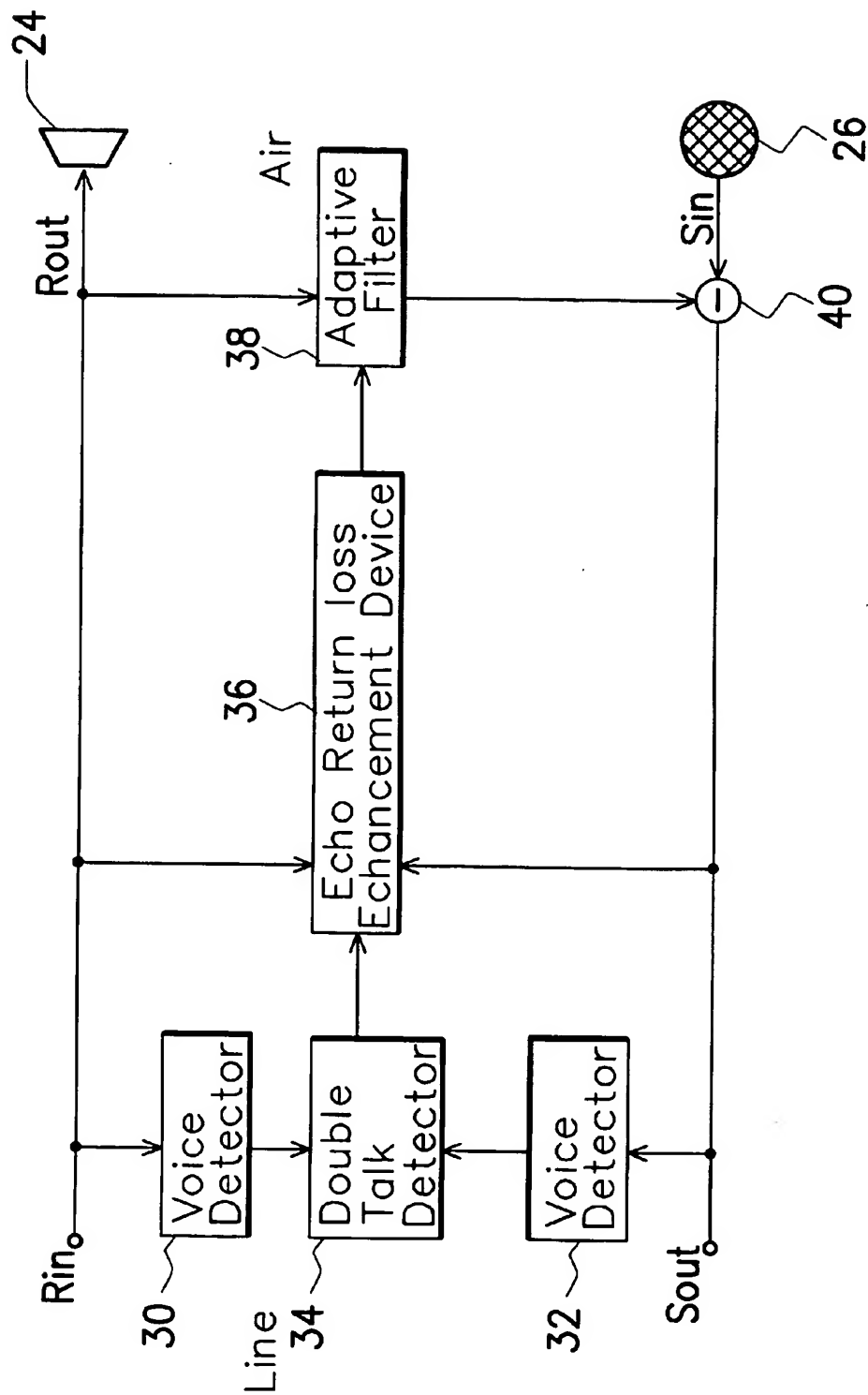


FIG. 2

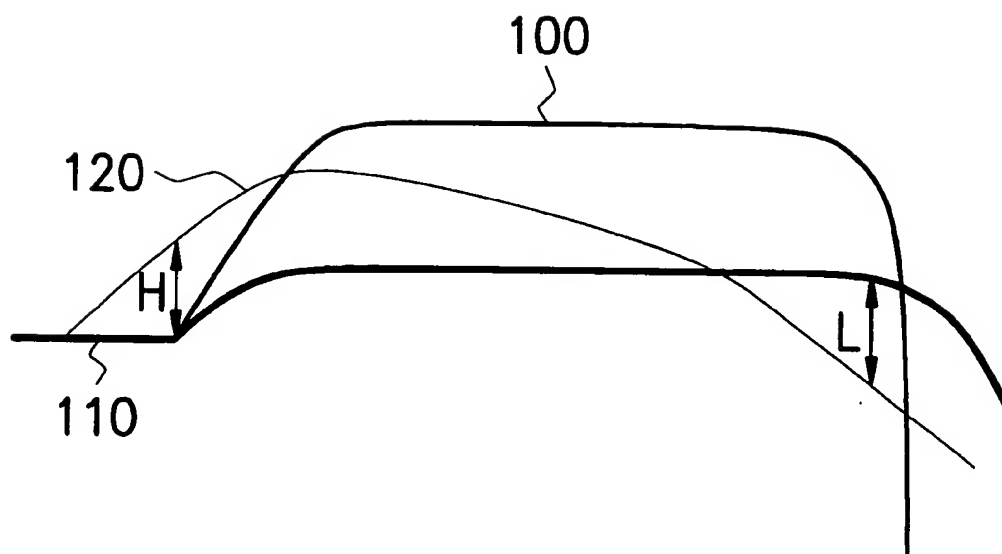


FIG. 3